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## **Vocational Rehabilitation following Traumatic Brain Injury: What is the evidence for clinical practice?**

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### **Introduction**

Traumatic brain injury (TBI) typically affects young adults with potentially many years of working life ahead of them. For people who were in work prior to their injury, return to work (RTW) is a common goal. However, a systematic review of RTW rates for people with TBI who were in work prior to their injury found that approximately 41% were in work at one and two years post TBI [1]. Since TBI is a leading cause of morbidity worldwide in young adults [2], this discrepancy between what people with TBI want and what they achieve is important. The question is does the research evidence inform clinicians how to help a person with TBI return to work?

### **What is Vocational Rehabilitation?**

Vocational rehabilitation (VR) is described as ‘*whatever helps someone with a health problem stay at, return to or remain in work*’ [3]. This broad description is intended to encompass efforts to support work return or job retention from all sectors. However, it is unhelpful in terms of encouraging researchers and clinicians to describe and explain TBI VR.

A variety of VR models for people with TBI exist both within and between countries but the terminology used to describe them is inconsistent. For example; in a systematic review of VR approaches following TBI, Fadyl et al [4] identified three broad models, which they called ‘*programme based*’, ‘*supported employed*’ and ‘*case co-ordination*’. Hart et al [5] conducted a similar review also concluding there were three models, which they called ‘*train and place*’, ‘*place and train*’ and ‘*a combined model*’. Tyerman et al (2012) identified four models: ‘*brain injury rehabilitation programmes with added VR elements*’, ‘*VR models adapted for TBI*’, ‘*case coordination/resource facilitation models*’, and ‘*consumer-directed models*’. Unfortunately, few of these models have been adequately described or rigorously evaluated.

Some studies report on job retention [6], others on finding new work [7], while most report on the clinical and work outcomes of service users evaluated as part of a rehabilitation service or system [8]. Detailed descriptions of the interventions delivered are rare [9]. Studies must describe not only the specific details of the intervention but also the context and structure essential to its delivery so clinicians can be informed about which interventions

work for whom and in what context. Without this information emerging evidence of effective interventions cannot be replicated by clinicians and outcomes cannot be compared at an individual or service level [10].

### **Does Vocational Rehabilitation increase return to work rates for people with TBI?**

Systematic reviews of the effectiveness of VR to help people with TBI RTW have produced mixed evidence. For example:- Ownsworth et al, (2004) reviewed 50 studies of prognostic indicators of RTW after TBI and found moderate evidence that providing VR was predictive of post TBI employment. Kendall et al (2006) reviewed 26 studies of TBI rehabilitation and employment outcomes and found that people with TBI who received VR were more likely to return to work and returned sooner than those who did not. However, other reviews of TBI and VR have found inconsistent evidence [11, 12]. In a recent systematic review of 80 studies of TBI and VR, Saltychev et al [13] said the results were inconclusive due to methodological problems of the studies reviewed. In summary, the evidence suggests vocational rehabilitation may increase return to work rates for people with TBI but it is neither robust nor overwhelming.

It appears both knowledge of VR and specialist knowledge of TBI are required to increase return to work rates in this population. A retrospective study of the outcomes of 107 people attending a pan-disability specialist VR centre, found people with TBI did less well in returning to work due to the cognitive and behavioural problems people with TBI experience [14]. Both Powell et al [15] and Ponsford et al [16] examined the effectiveness of TBI specialist community rehabilitation on work outcomes independently. Both concluded that vocational rehabilitation is needed in addition to TBI rehabilitation if work outcomes are to be improved for people with TBI. Thus, the evidence suggests that specialist knowledge of both VR and TBI is more likely to improve the chances of someone with TBI returning to work.

### **Predicting work return**

Many studies of TBI examine predictive factors for RTW. Factors predictive of a poor work outcome include having no job pre-injury, age over 40 years, longer duration of hospital stay and reduced functional ability on discharge [11, 12, 17]. Interestingly, these studies did not find initial Glasgow coma scores were predictive. However, a clinician cannot alter these predictive factors once a patient is at home. Additionally, the evidence for any predictor is not sufficient to decide who should benefit from VR.

Other factors may be more important determinants of whether a person with TBI returns to work. In a national prevalence study examining predictors of work return in 855 stroke survivors, Lindstrom et al (2009) found psychological factors such as believing work to be important and having the support of significant others were more important determinants of success than the stroke specific deficits. These personal factors such as the person's and families attitudes, beliefs and understanding of the impact of the TBI on the individual and environmental factors such as increasing an employer's understanding of TBI, suggesting appropriate work modifications are factors that may be influenced by a clinician as part of a VR programme. Clinicians and people with TBI want to know 'what is the best way to return to and remain in work?' However, this level of detail is currently lacking in research studies. For example, does educating the employer increase a person with TBI chances of successfully returning and maintaining work and is this more effectively done at the work site or is a letter or phone call enough? Does spending time helping both the person and family

understand the impact of the TBI help increase RTW success? To date, the research evidence does not appear to be answering these practical questions faced by clinicians but is what is needed to inform service design and delivery.

### **Methodological limitations**

Evidence for the effectiveness of VR and TBI is difficult to assess because of methodological problems with studies themselves [1, 4, 13, 18, 19]. The problems included differing definitions of ‘work’, a variety of outcome measures, heterogeneous study populations, different time scales, small-scale studies, limited descriptions of the interventions and poor quality research methodology. Sixty-eight of the 80 studies reviewed by Saltchev et al were observational, small, retrospective, single centre pre-post intervention designs. The lack of randomised controlled trials (RCTs) and cohort comparison studies make it difficult to determine whether any increase in employment rates is due to natural recovery, the intervention received or other factors such as publication bias. Nevertheless, the preponderance of small studies suggests that the centres involved feel their interventions warrant attention, yet at the same time highlights the problem of insufficient numbers of TBI people in each centre to conduct adequately powered trials.

There is clearly a need for rehabilitation researchers and clinicians to use an agreed minimal dataset of outcomes that enable meaningful comparison of outcomes [7, 20] see Box 1. There is also a need for funding and infrastructure to support multicentre randomised trials, more epidemiological evidence on the expected rate of recovery and long-term outcome after TBI including the longer-term financial and social impact of rehabilitation or lack of access to it (Maas et al, 2008).

**Box 1: Suggested minimum data set for use by clinicians and researchers when describing TBI VR**

- Agreed definition of work e.g. paid/unpaid work, full/part time education, voluntary work, house keeper
- Work metrics e.g. full/part time, number of hours worked, type of job and status, salary, type of enterprise i.e. private business, self-employed, statutory
- Who the intervention was aimed at :-
  - type of injury i.e. traumatic, acquired, stroke
  - injury severity e.g. minor, moderate, severe,
  - time post injury
- Details of people receiving the intervention (sex, age, pre-injury work status, medical details such as length of hospital stay, other injuries)
- Aim of the intervention e.g. job retention, work readiness, new work?
- The setting i.e. in-patient, outpatient clinic, community, work?
- Who delivered the intervention e.g. Occupational therapist, case manager (plus a description of their expertise and any specific training)
- Details of the intervention the patient received i.e. individual, group, work site visit, goal setting, cognitive rehabilitation, fatigue management (see [10])
- Involvement of others e.g. family, employers, other health and social care providers, other agencies e.g. Department for Work and Pensions, independent, charitable sector?
- Agreed set of standardised outcome measures to include work ability, functional ability, mood, quality of life, work readiness, and carer strain.
- Workplace accommodations implemented, including graded return to work, changes in job roles/responsibilities/hours, supernumerary and other support e.g. extra breaks, specialist equipment.
- Frequency and length of intervention and agreed length of follow-up i.e. 1, 2 5 and 10 years.
- Economic data to include costs of intervention (number of times patient seen x cost per hour of each therapist seen), number of GP and consultant appointments, change in persons wages (same, more or less than prior to injury), welfare benefits claimed, effect on carers income, cost to employers
- Compliance rates and any problems

## What is missing?

Very few studies examine the cost-effectiveness of VR following TBI which is surprising given the known importance of cost effectiveness in health based decision making [21]. There are no RCTS or trials of TBI VR, which include economic evaluation [22]. However, the few studies that have addressed cost issues look promising. Although not a formal cost benefit analysis, Murphy et al [8] compared the cost of providing VR and offset it against savings in state benefit payments in those who successfully return to work and stated that costs were recuperated within 26 months. A UK cohort comparison study found that a specialist TBI team intervention with VR from an occupational therapist (OT) cost approximately £75 more per participant over one year from a health and social care perspective compared to usual care [23]. This equated to one extra community OT visit. Those with access to the specialist TBI team reported a better quality of life and more had returned to work than those in usual care at one year. Given the young age of the TBI population, the success of any VR may last for many years and affect not only the person but also family members. These additional benefits need to be captured in studies attempting to measure resource use.

If health service commissioners are to be convinced of the value of providing TBI VR, studies that demonstrate the economic burden that TBI poses to families, the health service and society needs to reflect the cost savings that effective intervention may provide. This is problematic given that the impact of successful intervention such as job retention, reduction in anxiety and depression and improvements in quality of life tend to occur in the longer term. Additionally, reductions in resource use from successful VR such as fewer GP appointments, reductions in mental health service use, reduced dependency on welfare benefits occur in different departments from the NHS department originally providing the specialist intervention.

Finally, clinicians have no control over the fluctuating nature of the economy or competitive job markets, therefore factors that they can influence need to be measured, even when return to work is not possible or advisable. For example, knowledge of TBI and adjustment to its effects for the both the individual and family, work readiness, employer awareness, workplace accommodations are some of the possible factors that may warrant being measured that can be influenced by clinicians.

## Conclusion

People with TBI want to return to work, clinicians want to deliver evidenced based interventions and commissioners want to commission cost effective rehabilitation services. Unfortunately, the existing evidence for VR following TBI is too limited to draw accurate conclusions about its effectiveness or cost effectiveness [13]. A consensus on a minimum data set and well-designed high quality studies are essential to provide the evidence needed to support practice, inform commissioning and ensure people with TBI are given the best chance of returning to work following a TBI.

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